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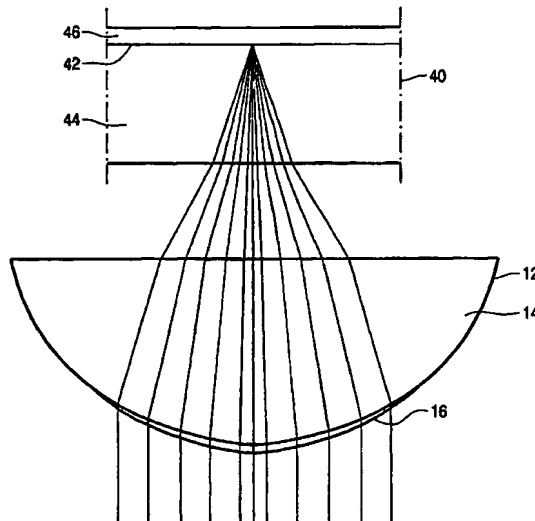
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[Continued on next page]

(54) Title: OPTICAL SCANNING DEVICE



(57) Abstract: An optical scanning device including an optical element (12) having at least two portions, including a body portion (14) having relatively low birefringence and a wavefront aberration generating portion (16) having a relatively high birefringence, the body portion having an attachment surface on which the wavefront aberration generating portion is formed. The wavefront aberration generating portion (16) has a first surface facing the body portion and a second surface facing away from the body portion, the first and second surfaces being of a different shape so that the thickness of the wavefront aberration generating portion, measured parallel to the optical axis, varies along a direction perpendicular to the optical axis. The thickness of the wavefront aberration generating portion at the optical axis is less than half the thickness of the body portion at said optical axis.

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G11B G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 04, 31 March 1998 (1998-03-31) -& JP 09 320103 A (SHARP CORP), 12 December 1997 (1997-12-12) abstract; figures 1-3,9,10,16,17 ---	1-26
Y	EP 0 146 178 A (PHILIPS NV) 26 June 1985 (1985-06-26) page 15, line 8 -page 16, line 4; figures 4,5 ---	1-26
Y	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 25, 12 April 2001 (2001-04-12) -& JP 2001 216675 A (ASAHI GLASS CO LTD), 10 August 2001 (2001-08-10) abstract; figures 1-3 ---	1-26
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	<p>WO 03 060892 A (DE VRIES JORRIT E ; HENDRIKS BERNARDUS H W (NL); KONINKL PHILIPS EL) 24 July 2003 (2003-07-24)</p> <p>page 8, line 5 -page 13, line 3; figures 1,2 page 18, line 3 -page 29, line 2; figures 5,7</p> <p>---</p>	<p>1-5,8, 10, 12-21, 23-26</p>
P, X	<p>WO 03 049095 A (KONINKL PHILIPS ELECTRONICS NV) 12 June 2003 (2003-06-12)</p> <p>page 13, line 13 -page 16, line 2; figure 7</p> <p>-----</p>	<p>1-3,8, 10, 12-19, 21,23-26</p>

INTERNATIONAL SEARCH REPORT

PCT/IB 03/04629

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
JP 09320103	A	12-12-1997	NONE		
EP 0146178	A	26-06-1985	NL	8304213 A	01-07-1985
			AT	42151 T	15-04-1989
			AU	573659 B2	16-06-1988
			AU	3635284 A	13-06-1985
			CA	1255527 A1	13-06-1989
			DD	229507 A5	06-11-1985
			DE	3477695 D1	18-05-1989
			DK	575884 A ,B	08-06-1985
			EP	0146178 A1	26-06-1985
			ES	8608179 A1	16-11-1986
			JP	1926630 C	25-04-1995
			JP	6014135 B	23-02-1994
			JP	60126616 A	06-07-1985
			SG	86490 G	04-01-1991
			US	4668056 A	26-05-1987
JP 2001216675	A	10-08-2001	NONE		
WO 03060892	A	24-07-2003	WO	03060892 A2	24-07-2003
WO 03049095	A	12-06-2003	WO	03049095 A2	12-06-2003